

## CLAIMS

I claim:

1       1. A method for inducing spin excitation within an  
2 object in a magnetic resonance imaging system that includes  
3 a transmit inductor system, said object having one or more  
4 intrinsic relaxation time constants, said method comprising  
5 the steps of:

6       (a) providing said transmit inductor system with the  
7 ability to generate a plurality of RF transmissions with  
8 different spatial characteristics;

9       (b) generating a first RF transmission from said  
10 transmit inductor system with first spatial characteristics;  
11 and

12       (c) prior to expiration of the longest of said  
13 intrinsic relaxation time constants, generating a second RF  
14 transmission from said transmit inductor system with second  
15 spatial characteristics different from said first spatial  
16 characteristics;

17       (d) whereby said spin excitation is induced by the  
18 combined effects of said first RF transmission and said  
19 second RF transmission.

1       2. The method of claim 1 wherein there is a time gap  
2 between said first RF transmission and said second RF  
3 transmission.

1       3. The method of claim 1 wherein there is no time gap  
2 between said first RF transmission and said second RF  
3 transmission.

1       4. The method of claim 1 wherein said first RF  
2 transmission is temporally overlapped by said second RF  
3 transmission.

1       5. The method of claim 1 wherein said method further  
2 comprises generating additional RF transmissions after said  
3 second RF transmission.

1       6. The method of claim 1 wherein said transmit  
2 inductor system is provided with a volume coil having a  
3 primary mode and a gradient mode, said first RF transmission  
4 being generated by said volume coil in said primary mode and  
5 said second RF transmission being generated by said volume  
6 coil in said gradient mode.

1       7. The method of claim 1 wherein said transmit  
2 inductor system is provided with a volume coil and at least  
3 one surface coil, said first RF transmission being generated  
4 by said volume coil and said second RF transmission being  
5 generated by said at least one surface coil.

1       8. The method of claim 1 wherein said transmit  
2 inductor system includes a plurality of surface coils, each  
3 of said RF transmissions being generated by at least one of  
4 said surface coils.

1       9.    The method of claim 1 wherein said first RF  
2 transmission transitions to said second RF transmission by  
3 continuously varying said spatial characteristics generated  
4 by said transmit inductor system.

1       10.   A method for inducing spin excitation within an  
2 object in a magnetic resonance imaging system that includes  
3 a transmit inductor system, said method comprising the steps  
4 of:

5           (a) providing said transmit inductor system with the  
6 ability to generate an RF transmission with continuously  
7 time-varying spatial characteristics; and

8           (b) generating an RF transmission from said transmit  
9 inductor system with spatial characteristics that change as  
10 a function of time;

11          (c) whereby said spin excitation is induced by the  
12 combined effects of said spatial characteristics that change  
13 as a function of time.

1       11.   The method of claim 10 wherein said object has one  
2 or more intrinsic relaxation time constants and said RF  
3 transmission has a duration of not longer than the longest  
4 of said intrinsic relaxation time constants.